

Appendix E –
Calibration Certificates

Certificates of Calibration



Certificate of Calibration

2015-5999-1

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name:	MJW Corporation	Manufacturer:	Bicron
Address:	15 Hazelwood Drive Suite 112 Amherst, NY 14228	Model:	Micro Rem SN: B693G
		Detector Manufacturer:	Bicron
Customer PO#	Work Order: 2015-5999	Det. Model:	Internal Scintillator SN: n/a
Calibration Method:	Electronic(*) and Source	Procedure:	MCP-01
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input checked="" type="checkbox"/> Geotropism <input checked="" type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input checked="" type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input type="checkbox"/> Reset			
<input type="checkbox"/> Audio <input type="checkbox"/> Window Status <input type="checkbox"/> FS Response <input checked="" type="checkbox"/> Linearity <input type="checkbox"/> Alarm Set			
Temperature: 70 F		Humidity: 50%	Pressure: 28.7 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
X 0.1*	4 uR/hr	3.9 uR/hr	3.9 uR/hr	3.4-4.6	X 0.1*	16 uR/hr	16 uR/hr	16 uR/hr	14.4-17.6
X 1*	40 uR/hr	40 uR/hr	40 uR/hr	34-46	X 1	160 uR/hr	160 uR/hr	160 uR/hr	144-176
X 10	400 uR/hr	400 uR/hr	400 uR/hr	340-460	X 10	1600 uR/hr	1600 uR/hr	1600 uR/hr	1440-1760
X 100	4000 uR/hr	4000 uR/hr	4000 uR/hr	3400-4600	X 100	16000 uR/hr	16000 uR/hr	16000 uR/hr	14400-17600
X 1K	40000 uR/hr	40000 uR/hr	40000 uR/hr	34000-46000	X 1K	160000 uR/hr	162000 uR/hr	162000 uR/hr	144000-176000
X 0.1*	400 cpm =	3.9 uR/hr	3.9 uR/hr	For Reference	X 0.1*	1600 cpm =	16 uR/hr	16 uR/hr	For Reference
X 1*	4 kcpm =	40 uR/hr	40 uR/hr	For Reference	X 1*	16 kcpm =	160 uR/hr	160 uR/hr	For Reference

Electronic Instruments

Pulser: 500-2 sn# 220106

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Cs137	7773CM	Cell I Gamma Irradiator	1.581 Ci				

Instrument Status

Disc/Sens: 610 mV

Statement of Certification

MJW Technical Services, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (AL)		QA Technician:		Date:	5-6-15
Calibration Date:	05/05/2015	Calibration Due:	05/05/2016		



Certificate of Calibration

2015-6089-2

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name: MJW Technical Services		Manufacturer: Bicon	
Address: 243 Root Street Suite 100 Olean, NY 14760		Model: Micro Rem Detector Manufacturer: Bicon	SN: 1487
Customer PO#	Work Order: 2015-6089	Det. Model: Internal Scintillator	SN: n/a
Calibration Method: Electronic(*) and Source		Procedure: MCP-01	
Instrument Received: <input type="checkbox"/> Within Tolerance <input checked="" type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input checked="" type="checkbox"/> Geotropism <input checked="" type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. CK <input checked="" type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input type="checkbox"/> Audio <input type="checkbox"/> Window Status <input type="checkbox"/> FS Response <input checked="" type="checkbox"/> Linearity <input type="checkbox"/> Alarm Set			
Temperature: 71.2 F		Humidity: 57%	Pressure: 28.5 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
X 0.1*	4 uR/hr	3.8 uR/hr	3.8 uR/hr	3.4-4.6	X 0.1*	16 uR/hr	16.2 uR/hr	16.2 uR/hr	14.4-17.6
X 1*	40 uR/hr	40 uR/hr	40 uR/hr	34-46	X 1	160 uR/hr	130 uR/hr	160 uR/hr	144-176
X 10	400 uR/hr	350 uR/hr	400 uR/hr	340-460	X 10	1600 uR/hr	1420 uR/hr	1600 uR/hr	1440-1760
X 100	4000 uR/hr	3500 uR/hr	4000 uR/hr	3400-4600	X 100	16000 uR/hr	14500 uR/hr	16000 uR/hr	14400-17600
X 1K	40000 uR/hr	34000 uR/hr	41000 uR/hr	34000-46000	X 1K	160000 uR/hr	142000 uR/hr	160000 uR/hr	144000-176000
X 0.1*	400 cpm =	400 uR/hr	400 uR/hr	For Reference	X 0.1*	1600 cpm =	1600 uR/hr	1600 uR/hr	For Reference
X 1*	4 kcpm =	4000 uR/hr	4000 uR/hr	For Reference	X 1*	16 kcpm =	160000 uR/hr	160000 uR/hr	For Reference

Electronic Instruments

Pulser: 500-2 sn# 220099

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Cs137	7773CM	Cell 1 Gamma Irradiator	1.577 Ci				

Instrument Status

Disc/Sens: 650 mV

Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator, facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (GH)	QA Technician:	Date: 6/19/15
Calibration Date: 06/18/2015	Calibration Due: 06/18/2016	



Certificate of Calibration

2015-6178-4

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name:	MJW Corporation	Manufacturer:	Bicron
Address:	15 Hazelwood Drive Suite 112 Amherst, NY 14228	Model:	Micro Rem SN: A224U
		Detector Manufacturer:	Bicron
Customer PO#	Work Order: 2015-6178	Det. Model:	Internal Scintillator SN: n/a
Calibration Method: Electronic(*) and Source		Procedure:	MCP-01
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input checked="" type="checkbox"/> Geotropism <input checked="" type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input checked="" type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input type="checkbox"/> Reset			
<input type="checkbox"/> Audio <input type="checkbox"/> Window Status <input type="checkbox"/> FS Response <input checked="" type="checkbox"/> Linearity <input type="checkbox"/> Alarm Set			
Temperature: 72 F		Humidity: 50%	Pressure: 28.4 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
X 0.1*	4 uR/hr	3.9 uR/hr	3.9 uR/hr	3.4-4.6	X 0.1*	16 uR/hr	16.1 uR/hr	16.1 uR/hr	14.4-17.6
X 1*	40 uR/hr	40 uR/hr	40 uR/hr	34-46	X 1	160 uR/hr	160 uR/hr	160 uR/hr	144-176
X 10	400 uR/hr	400 uR/hr	400 uR/hr	340-460	X 10	1600 uR/hr	1600 uR/hr	1600 uR/hr	1440-1760
X 100	4000 uR/hr	4000 uR/hr	4000 uR/hr	3400-4600	X 100	16000 uR/hr	16200 uR/hr	16200 uR/hr	14400-17600
X 1K	40000 uR/hr	40000 uR/hr	40000 uR/hr	34000-46000	X 1K	160000 uR/hr	160000 uR/hr	160000 uR/hr	144000-176000
X 0.1*	400 cpm =	3.9 uR/hr	3.9 uR/hr	For Reference	X 0.1*	1600 cpm =	16.1 uR/hr	16.1 uR/hr	For Reference
X 1*	4 kcpm =	40 uR/hr	40 uR/hr	For Reference	X 1*	16 kcpm =	160 uR/hr	160 uR/hr	For Reference

Electronic Instruments

Pulser: 500-2 sn# 220106

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Cs137	7773CM	Cell 1 Gamma Irradiator	1.572 Ci				

Instrument Status

Disc/Sens: 620 mV

Statement of Certification

MJW Technical Services, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician:
(AL)

QA Technician:

Date:

8/19/15

Calibration Date: 08/04/2015

Calibration Due: 08/04/2016



Certificate of Calibration

2015-6241-1

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name:	MJW Corporation	Manufacturer:	Ludlum Measurements
Address:	15 Hazelwood Drive Suite 112 Amherst, NY 14228	Model:	2241-2 SN: 206098
		Detector Manufacturer:	Ludlum Measurements
Customer PO#	Work Order: 2015-6241	Det. Model:	44-10 SN: PR112642 1-Red
Calibration Method:	Electronic(*)	Procedure:	SOP-06

Instrument Received:	<input checked="" type="checkbox"/> Within Tolerance	<input type="checkbox"/> Out of Tolerance	<input type="checkbox"/> Repairs Required	<input type="checkbox"/> Other (See Comments)			
<input type="checkbox"/> Geotropism	<input type="checkbox"/> Meter Zero	<input checked="" type="checkbox"/> Mech. Ck	<input type="checkbox"/> HV Readout	<input checked="" type="checkbox"/> Battery Check	<input checked="" type="checkbox"/> Reset		
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Window Status	<input checked="" type="checkbox"/> FS Response	<input checked="" type="checkbox"/> Linearity	<input checked="" type="checkbox"/> Alarm Set			
Temperature:	71 F	Humidity:	52%	Pressure:	28.5 in Hg	Altitude:	1450 ft

Instrument Calibration									
Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Ratemeter Mode*	40 cpm	40 cpm	40 cpm	36-44	Ratemeter Mode*	400 cpm	399 cpm	399 cpm	360-440
Ratemeter Mode*	4 kcpm	3.99 kcpm	3.99 kcpm	3.6-4.4	Ratemeter Mode*	40 kcpm	39.9 kcpm	39.9 kcpm	36-44
Ratemeter Mode*	400 kcpm	399 kcpm	399 kcpm	360-440	Scaler Mode*	40 cpm	40 cpm	40 cpm	36-44
Scaler Mode*	400 cpm	400 cpm	400 cpm	360-440	Scaler Mode*	4 kcpm	3.993 kcpm	3.993 kcpm	3.6-4.4
Scaler Mode*	40 kcpm	39.929 kcpm	39.929 kcpm	36-44	Scaler Mode*	400 kcpm	399.944 kcpm	399.944 kcpm	360-440

Electronic Instruments
Pulser: 500-2 sn# 220106

Sources							
Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Am241	UB992	Y	2344511.523 dpm	159080	6.8 %	14.71	0 inch
Cs137	UB994	Y	2381013.672 dpm	220200	9.2 %	10.87	0 inch

Instrument Status
Disc/Sens: 10 mV

Alarm Status
Rate Alarm: 200 kcpm Rate Alert: 100 kcpm Scal Alarm: 915 kcts

Detector Status
CC: 100e-2 DT: 0 usec Oper. V: 850 V

Comments
Detector settings & voltage are identical for switch position 1 & 2.

Response to Thorium welding rod check source #114 on contact = 13.7 kcpm \pm 20% (16.4 kcpm - 11.0 kcpm)

Statement of Certification
MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (AL)		QA Technician:		Date:	9-1-15
Calibration Date:	09/01/2015	Calibration Due:	09/01/2016		



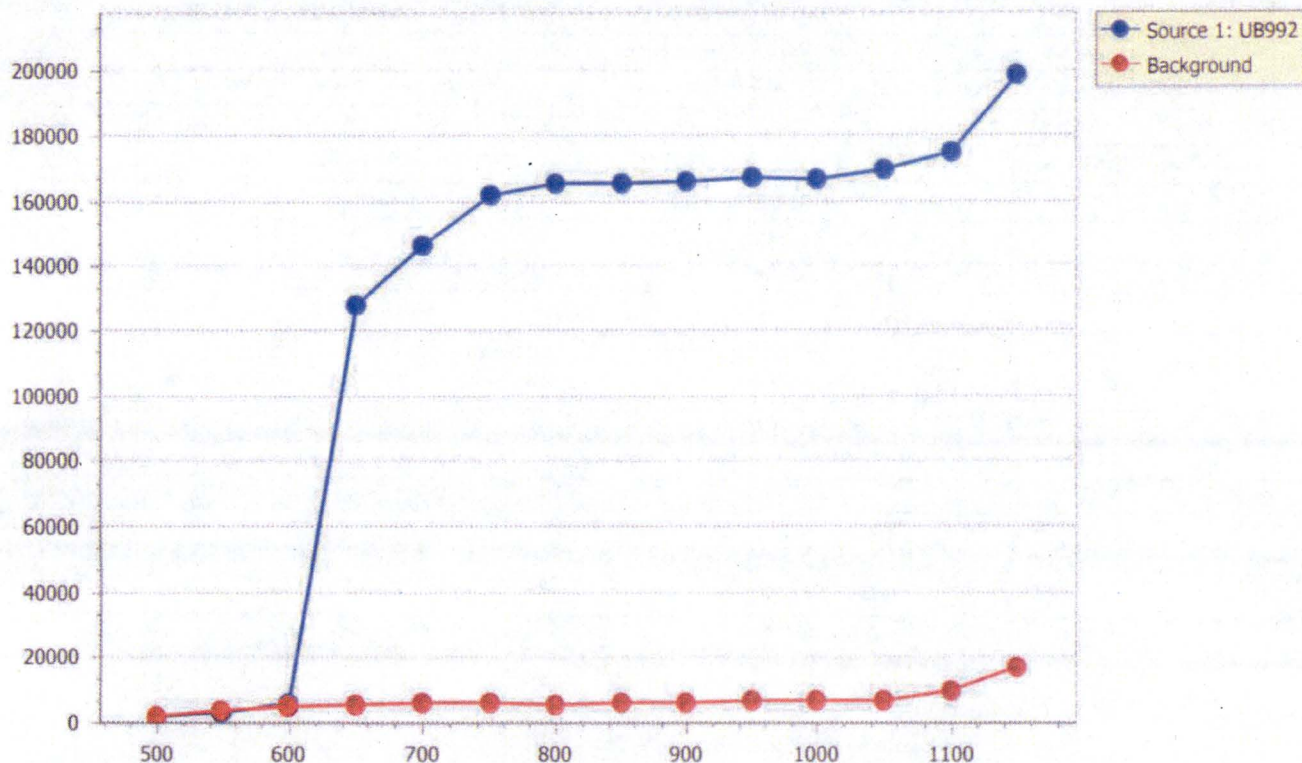
243 Root Street Suite 100
Olean, NY 14760

Certificate of Calibration

2015-6241-1

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241-2	SN: 206098
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6241	Det. Model: 44-10	SN: PR112642 1-Red
Calibration Method: Electronic(*)		Procedure: SOP-06	
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input type="checkbox"/> Geotropism <input type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input checked="" type="checkbox"/> Audio <input type="checkbox"/> Window Status <input checked="" type="checkbox"/> FS Response <input checked="" type="checkbox"/> Linearity <input checked="" type="checkbox"/> Alarm Set			
Temperature: 71 F		Humidity: 52%	Pressure: 28.5 in Hg Altitude: 1450 ft

Source Voltage Plateaus



Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The Instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (AL) <i>Adam W. [Signature]</i>	QA Technician: <i>[Signature]</i>	Date: 9-1-15
Calibration Date: 09/01/2015	Calibration Due: 09/01/2016	



Certificate of Calibration

2015-6243-1

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241-2	SN: 262737
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6243	Det. Model: 44-10	SN: PR111127 1-Red
Calibration Method: Electronic(*)		Procedure: SOP-06	

Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)					
<input type="checkbox"/> Geotropism	<input type="checkbox"/> Meter Zero	<input checked="" type="checkbox"/> Mech. Ck	<input type="checkbox"/> HV Readout	<input checked="" type="checkbox"/> Battery Check	<input checked="" type="checkbox"/> Reset
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Window Status	<input checked="" type="checkbox"/> FS Response	<input checked="" type="checkbox"/> Linearity	<input checked="" type="checkbox"/> Alarm Set	
Temperature: 71.6 F		Humidity: 50%		Pressure: 28.5 in Hg Altitude: 1450 ft	

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Ratemeter Mode*	400 cpm	400 cpm	400 cpm	360-440	Ratemeter Mode*	4 kcpm	3.99 kcpm	3.99 kcpm	3.6-4.4
Ratemeter Mode*	40 kcpm	39.9 kcpm	39.9 kcpm	36-44	Ratemeter Mode*	400 kcpm	399 kcpm	399 kcpm	360-440
Scaler Mode*	400 cpm	400 cpm	400 cpm	360-440	Scaler Mode*	4 kcpm	3.991 kcpm	3.991 kcpm	3.6-4.4
Scaler Mode*	40 kcpm	39.942 kcpm	39.942 kcpm	36-44	Scaler Mode*	400 kcpm	399.824 kcpm	399.824 kcpm	360-440

Electronic Instruments

Pulser: 500-2 sn# 220106

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Am241	UB992	Y	2344501.240 dpm	134517	5.7 %	17.54	0
Cs137	UB994	Y	2380863.342 dpm	214047	9.0 %	11.11	0 inch

Instrument Status

Disc/Sens: 10 mV

Alarm Status

Rate Alarm: 300 kcpm Rate Alert: 200 kcpm Scal Alarm: 300 kcts

Detector Status

CC: 100e-2 DT: 0 usec Oper. V: 1000 V Num: 1

Comments

Response to Thorium welding rod check source #116 on contact = 16.8 kcpm $\pm 20\%$ (13.44 kcpm - 20.16 kcpm)

Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (AL)	QA Technician:	Date: 9-3-15
Calibration Date: 09/02/2015	Calibration Due: 09/02/2016	



Certificate of Calibration

2015-6243-2

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241-2	SN: 262737
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6243	Det. Model: 43-90	SN: PR277929 2-Yellow
Calibration Method: Electronic(*)		Procedure: SOP-06	

Instrument Received: ☒ Within Tolerance ☐ Out of Tolerance ☐ Repairs Required ☐ Other (See Comments)

☐ Geotropism ☐ Meter Zero ☒ Mech. Ck ☐ HV Readout ☒ Battery Check ☒ Reset

☒ Audio ☐ Window Status ☒ FS Response ☒ Linearity ☒ Alarm Set

Temperature: 71.6 F Humidity: 50% Pressure: 28.5 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Ratemeter Mode*	400 cpm	400 cpm	400 cpm	360-440	Ratemeter Mode*	4 kcpm	3.99 kcpm	3.99 kcpm	3.6-4.4
Ratemeter Mode*	40 kcpm	39.9 kcpm	39.9 kcpm	36-44	Ratemeter Mode*	400 kcpm	399 kcpm	399 kcpm	360-440
Scaler Mode*	400 cpm	400 cpm	400 cpm	360-440	Scaler Mode*	4 kcpm	3.991 kcpm	3.991 kcpm	3.6-4.4
Scaler Mode*	40 kcpm	39.942 kcpm	39.942 kcpm	36-44	Scaler Mode*	400 kcpm	399.824 kcpm	399.824 kcpm	360-440

Electronic Instruments

Pulser: 500-2 sn# 220106

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Pu239	C7-636	a 4pi	111567.863 dpm	21284	19.1 %	5.24	0 inch

Instrument Status

Disc/Sens: 10 mV

Alarm Status

Rate Alarm: 300 kcpm Rate Alert: 200 kcpm Scal Alarm: 300 kcts

Detector Status

CC: 100e-2 DT: 0 usec Oper. V: 700 V Num: 2

Comments

Response to Thorium welding rod check source #116 on contact = 80 cpm $\pm 20\%$ (64 cpm - 96 cpm)

Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The Instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician:
(AL)

QA Technician:

Date: 9-3-15

Calibration Date: 09/02/2015

Calibration Due: 09/02/2016



Certificate of Calibration

2015-6326-4

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241	SN: 196664
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6326	Det. Model: 44-10	SN: PR256142
Calibration Method: Electronic(*)		Procedure: SOP-06	
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input type="checkbox"/> Geotropism <input checked="" type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input checked="" type="checkbox"/> Audio <input type="checkbox"/> Window Status <input checked="" type="checkbox"/> FS Response <input checked="" type="checkbox"/> Linearity <input checked="" type="checkbox"/> Alarm Set			
Temperature: 70.2 F		Humidity: 45%	Pressure: 28.3 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Ratemeter Mode*	40 cpm	40 cpm	40 cpm	36-44	Ratemeter Mode*	400 cpm	400 cpm	400 cpm	360-440
Ratemeter Mode*	4 kcpm	3.99 kcpm	3.99 kcpm	3.6-4.4	Ratemeter Mode*	40 kcpm	39.9 kcpm	39.9 kcpm	36-44
Ratemeter Mode*	400 kcpm	399 kcpm	399 kcpm	360-440	Scaler Mode*	40 cpm	40 cpm	40 cpm	36-44
Scaler Mode*	400 cpm	400 cpm	400 cpm	360-440	Scaler Mode*	4 kcpm	3.992 kcpm	3.992 kcpm	3.6-4.4
Scaler Mode*	40 kcpm	39.907 kcpm	39.907 kcpm	36-44	Scaler Mode*	400 kcpm	398.987 kcpm	398.987 kcpm	360-440

Electronic Instruments

Pulser: 500-2 sn# 220106

Scaler: 2200 sn# 287163

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Am241	UB992	Y	2344079.688 dpm	131062	5.6 %	17.86	0 inch
Cs137	UB994	Y	2374408.107 dpm	235181	9.9 %	10.10	0 inch

Instrument Status

Voltage: 1400 V Disc/Sens: 10 mV

Alarm Status

Rate Alarm: 300 kcpm Rate Alert: 200 kcpm Scal Alarm: 300 kcts

Detector Status

CC: 100E-2 DT: 0 usec Oper. V: 1400 V

Comments

Set for Gross Counting only with 96" cable.

Model 44-10 energy resolution = 11%, acceptable detector energy resolution is <13%

Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The Instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician:
(AL)

QA Technician:

Date: 10/15/2015

Calibration Date: 10/15/2015

Calibration Due: 10/15/2016



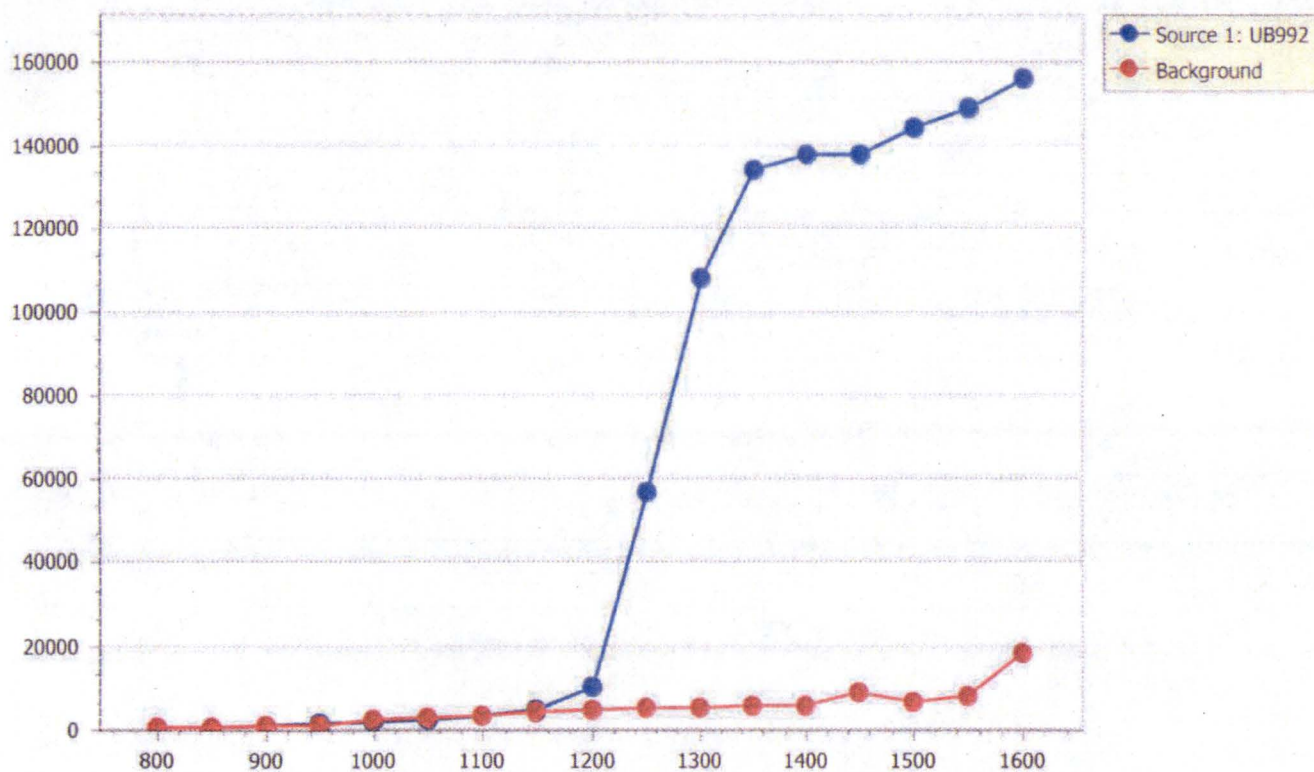
243 Root Street Suite 100
Olean, NY 14760

Certificate of Calibration

2015-6326-4

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241	SN: 196664
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6326	Det. Model: 44-10	SN: PR256142
Calibration Method: Electronic(*)		Procedure: SOP-06	
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input type="checkbox"/> Geotropism <input checked="" type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input checked="" type="checkbox"/> Audio <input type="checkbox"/> Window Status <input checked="" type="checkbox"/> FS Response <input checked="" type="checkbox"/> Linearity <input checked="" type="checkbox"/> Alarm Set			
Temperature: 70.2 F		Humidity: 45%	Pressure: 28.3 in Hg
			Altitude: 1450 ft

Source Voltage Plateaus



Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician:
(AL)

Alan M. [Signature]

QA Technician:

[Signature]

Date:

10/20/15

Calibration Date: 10/15/2015

Calibration Due: 10/15/2016



Certificate of Calibration

2015-6361-1

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241-2	SN: 262641
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6361	Det. Model: 43-90	SN: PR277930 2-Yellow
Calibration Method: Electronic(*)		Procedure: SOP-06	
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input type="checkbox"/> Geotropism <input type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input checked="" type="checkbox"/> Audio <input type="checkbox"/> Window Status <input checked="" type="checkbox"/> FS Response <input type="checkbox"/> Linearity <input checked="" type="checkbox"/> Alarm Set			
Temperature: 69.1 F		Humidity: 41%	Pressure: 28.6 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Ratemeter Mode*	40 cpm	39.3 cpm	39.3 cpm	36-44	Ratemeter Mode*	400 cpm	400 cpm	400 cpm	360-440
Ratemeter Mode*	4 kcpm	3.96 kcpm	3.96 kcpm	3.6-4.4	Ratemeter Mode*	40 kcpm	39.6 kcpm	39.6 kcpm	36-44
Ratemeter Mode*	400 kcpm	396 kcpm	396 kcpm	360-440	Scaler Mode*	40 cpm	40 cpm	40 cpm	36-44
Scaler Mode*	400 cpm	396 cpm	396 cpm	360-440	Scaler Mode*	4 kcpm	3.968 kcpm	3.968 kcpm	3.6-4.4
Scaler Mode*	40 kcpm	39.677 kcpm	39.677 kcpm	36-44	Scaler Mode*	400 kcpm	396.678 kcpm	396.678 kcpm	360-440

Electronic Instruments

Pulser: 500-2 sn# 220099

Scaler: 2200 sn# 304428

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Am241	C7-660	a 4pi	110229.264 dpm	25300	23.0 %	4.35	0 inch
Pu239	C7-635	a 4pi	111427.358 dpm	26250	23.6 %	4.24	0 inch
Th230	C7-643	a 4pi	99310.909 dpm	22370	22.5 %	4.44	0 inch

Instrument Status

Disc/Sens: 10 mV

Alarm Status

Rate Alarm: 800 kcpm Rate Alert: 500 kcpm Scal Alarm: 990 kcpm

Detector Status

CC: 100e-2 DT: 0 usec Oper. V: 900 V Num: 2

Statement of Certification

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Calibration Technician:
(GH)

QA Technician:

Date: 11/3/15

Calibration Date: 11/03/2015

Calibration Due: 11/03/2016



Certificate of Calibration

2015-6361-2

243 Root Street Suite 100
Olean, NY 14760

Customer		Instrument	
Customer Name: MJW Corporation		Manufacturer: Ludlum Measurements	
Address: 15 Hazelwood Drive Suite 112 Amherst, NY 14228		Model: 2241-2 SN: 262641	
		Detector Manufacturer: Ludlum Measurements	
Customer PO#	Work Order: 2015-6361	Det. Model: 44-10 SN: PR288429	1-Red
Calibration Method: Electronic(*)		Procedure: SOP-06	
Instrument Received: <input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)			
<input type="checkbox"/> Geotropism <input type="checkbox"/> Meter Zero <input checked="" type="checkbox"/> Mech. Ck <input type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset			
<input checked="" type="checkbox"/> Audio <input type="checkbox"/> Window Status <input checked="" type="checkbox"/> FS Response <input type="checkbox"/> Linearity <input checked="" type="checkbox"/> Alarm Set			
Temperature: 69.1 F		Humidity: 41%	Pressure: 28.6 in Hg Altitude: 1450 ft

Instrument Calibration

Multiplier/Range	Calibration Point	Instrument Response			Multiplier/Range	Calibration Point	Instrument Response		
		As Found	As Left	Tolerance			As Found	As Left	Tolerance
Ratemeter Mode*	40 cpm	39.3 cpm	39.3 cpm	35-44	Ratemeter Mode*	400 cpm	400 cpm	400 cpm	360-440
Ratemeter Mode*	4 kcpm	3.96 kcpm	3.96 kcpm	3.5-4.4	Ratemeter Mode*	40 kcpm	39.6 kcpm	39.6 kcpm	36-44
Ratemeter Mode*	400 kcpm	396 kcpm	396 kcpm	360-440	Scaler Mode*	40 cpm	40 cpm	40 cpm	36-44
Scaler Mode*	400 cpm	396 cpm	396 cpm	360-440	Scaler Mode*	4 kcpm	3.968 kcpm	3.968 kcpm	3.5-4.4
Scaler Mode*	40 kcpm	39.677 kcpm	39.677 kcpm	36-44	Scaler Mode*	400 kcpm	396.678 kcpm	396.678 kcpm	360-440

Electronic Instruments

Pulser: 500-2 sn# 220099

Scaler: 2200 sn# 304428

Sources

Isotope	Serial#	Type	Activity	Response	Efficiency	CF	Distance
Am241	UB992	Y	2343863.800 dpm	176266	7.5 %	13.33	0 inch
Cs137	UB994	Y	2371561.372 dpm	268517	11.3 %	8.85	0 inch

Instrument Status

Disc/Sens: 10 mV

Alarm Status

Rate Alarm: 500 kcpm Rate Alert: 300 kcpm Scal Alarm: 900 kcpm

Detector Status

CC: 100e-2 DT: 0 usec Oper. V: 1000 V Num: 1

Comments

Model 44-10 energy resolution = 8.9%, acceptable detector energy resolution is <13%

Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The Instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (GH)		QA Technician:		Date:	11/3/15
Calibration Date:	11/03/2015	Calibration Due:	11/03/2016		



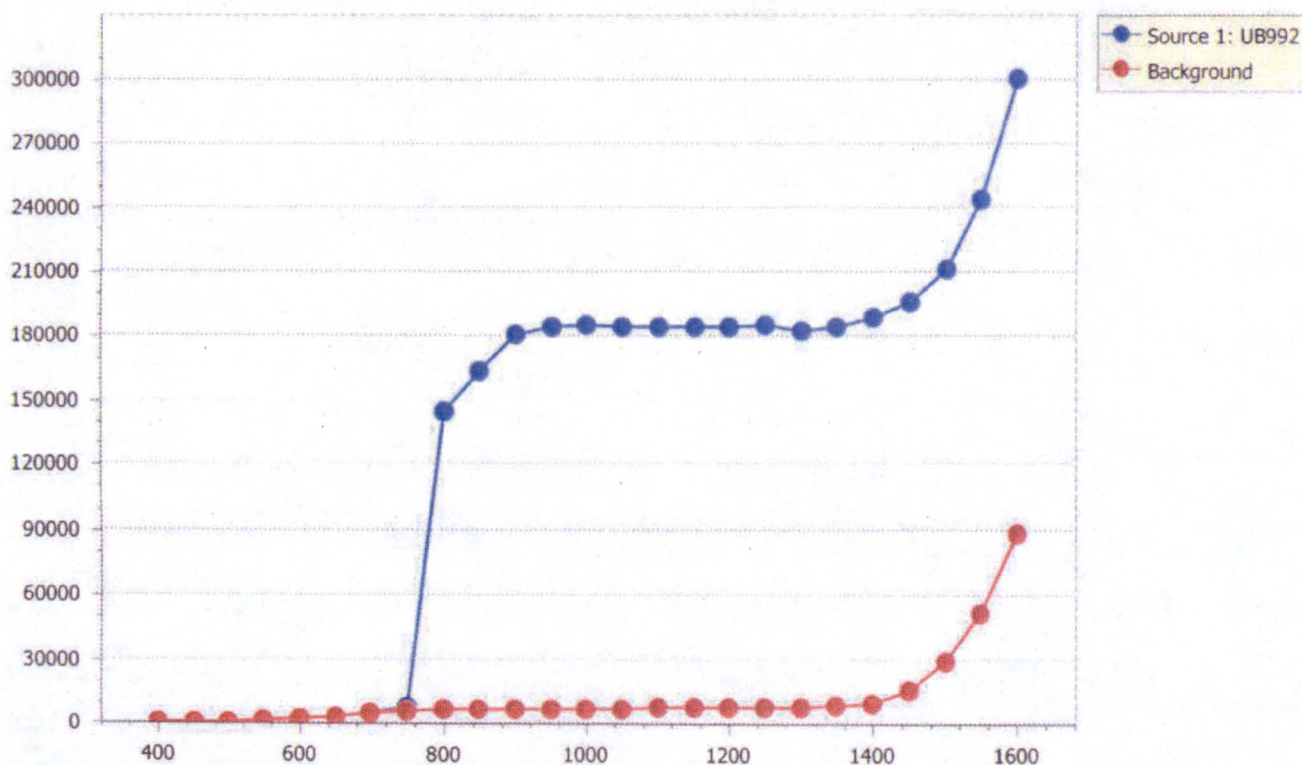
243 Root Street Suite 100
Olean, NY 14760

Certificate of Calibration

2015-6361-2

Customer		Instrument	
Customer Name:	MJW Corporation	Manufacturer:	Ludlum Measurements
Address:	15 Hazelwood Drive Suite 112 Amherst, NY 14228	Model:	2241-2 SN: 262641
		Detector Manufacturer:	Ludlum Measurements
Customer PO#	Work Order: 2015-6361	Det. Model:	44-10 SN: PR288429 1-Red
Calibration Method:	Electronic(*)	Procedure:	SOP-06
Instrument Received:	<input checked="" type="checkbox"/> Within Tolerance <input type="checkbox"/> Out of Tolerance <input type="checkbox"/> Repairs Required <input type="checkbox"/> Other (See Comments)		
<input type="checkbox"/> Geotropism	<input type="checkbox"/> Meter Zero	<input checked="" type="checkbox"/> Mech. Ck	<input type="checkbox"/> HV Readout <input checked="" type="checkbox"/> Battery Check <input checked="" type="checkbox"/> Reset
<input checked="" type="checkbox"/> Audio	<input type="checkbox"/> Window Status	<input checked="" type="checkbox"/> FS Response	<input type="checkbox"/> Linearity <input checked="" type="checkbox"/> Alarm Set
Temperature:	69.1 F	Humidity:	41% Pressure: 28.6 in Hg Altitude: 1450 ft

Source Voltage Plateaus



Statement of Certification

MJW Technical Services, Inc certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology or to the calibrator facilities of other International Standards organization members, or have been derived from accepted values of natural physical constants or have been derived by the ration type of calibration techniques. The calibration system conforms to the requirements ISO/IEC 17025 and ANSI N323. The Instrument listed above was inspected prior to shipment and it met all the manufacturer's published operating specifications. (MJW Technical Services is not responsible for damage incurred during shipment or use of this instrument).

Calibration Technician: (GH)		QA Technician:		Date:	11/3/15
Calibration Date:	11/03/2015	Calibration Due:	11/03/2016		